

WHAT IS CLAIMED IS:

1.           A semiconductor device using a thin-film transistor obtained by laminating a gate electrode, a gate insulator, a source electrode, a drain electrode and a semiconductor layer in that order on an insulating substrate, wherein said semiconductor layer is formed of a polycrystalline material, each of said source and drain electrodes has a taper portion on the channel side, and the width of said taper portion in the direction of the channel length is smaller than the average particle size of semiconductor crystals on each of said source and drain electrodes.
2.           A semiconductor device according to claim 1, wherein the width of said taper portion in the direction of the channel length is 50 nm or less.
3.           A semiconductor device according to claim 1, wherein the angle of the taper portion of each of said source and drain electrodes to the substrate is 45° or more.
4.           A semiconductor device according to claim 1, wherein said semiconductor layer is formed of an acene type material.
5.           A semiconductor device using a thin-film transistor obtained by laminating a gate electrode, a gate insulator, a source electrode, a drain electrode and a semiconductor layer in that order on an insulating substrate, wherein said semiconductor layer is formed of a polycrystalline material, and the

nucleus for growth of semiconductor crystals in contact with at least a region of the side on the channel side of each of said source and drain electrodes, which region has a height of 3 nm or less above the gate insulator, is on the gate insulator.

6. A semiconductor device according to claim 5, wherein said semiconductor layer is formed of an acene type material.

7. A semiconductor device using a thin-film transistor obtained by laminating a gate electrode, a gate insulator, a source electrode, a drain electrode and a semiconductor layer in that order on an insulating substrate, wherein the shape of the side on the channel side of each of said source and drain electrodes is convex upward with respect to the substrate surface.

8. A semiconductor device according to claim 7, wherein an organic compound layer different from said semiconductor layer is present between said gate insulator and said semiconductor layer in the channel region between said source and drain electrodes.

9. A semiconductor device according to claim 7, wherein said source and drain electrodes are formed by applying metal ink.

10. A semiconductor device according to claim 7, wherein the organic compound layer different from said semiconductor layer, which is present between said gate insulator and said semiconductor layer in the channel

region between said source and drain electrodes, is a water-repellent adsorbed-molecules layer.

11. A semiconductor device according to claim 7 and claim 10, wherein the water-repellent adsorbed-molecules layer as the organic compound layer different from said semiconductor layer, which is present between said gate insulator and said semiconductor layer in the channel region between said source and drain electrodes, is a monomolecular film.

12. A semiconductor device using a thin-film transistor obtained by laminating a gate electrode, a gate insulator, a source electrode, a drain electrode, a semiconductor layer and a protective insulating film in that order on an insulating substrate, wherein said semiconductor layer is formed of an organic compound, and each of said source and drain electrodes has a reverse-taper portion.

13. A semiconductor device according to claim 12, wherein an organic compound layer different from said semiconductor layer is present between said gate insulator and said semiconductor layer in the channel region between said source and drain electrodes.

14. A semiconductor device according to claim 12, wherein said source and drain electrodes are formed by applying metal ink.

15. A semiconductor device according to claim 12, wherein the organic compound layer different from said semiconductor layer, which is present between said gate

insulator and said semiconductor layer in the channel region between said source and drain electrodes, is a water-repellent adsorbed-molecules layer.

16. A semiconductor device according to claim 2 and claim 15, wherein the water-repellent adsorbed-molecules layer as the organic compound layer different from said semiconductor layer, which is present between said gate insulator and said semiconductor layer in the channel region between said source and drain electrodes, is a monomolecular film.

17. A semiconductor device using a thin-film transistor obtained by laminating a gate electrode, a gate insulator, a source electrode, a drain electrode and a semiconductor layer in that order on an insulating substrate, wherein an organic compound layer different from said semiconductor layer is present between each of said source and drain electrodes and said semiconductor layer, and the average thickness of the organic compound layer is not more than 10 Å and not less than 1 Å.

18. A semiconductor device according to claim 17, wherein the organic compound present between each of said source and drain electrodes and said semiconductor layer has a thiol group.

19. A semiconductor device according to claim 17, wherein the organic compound present between each of said source and drain electrodes and said semiconductor layer is an alkane thiol.

20. A semiconductor device according to claim 17, wherein said source and drain electrodes are made of gold, silver, copper, platinum, palladium, tin, or an alloy or mixture containing two or more of these metals.

21. A semiconductor device according to claim 17, wherein a decrease of the work function of said source and drain electrodes caused by the influence of the organic compound layer present between each of said source and drain electrodes and said semiconductor layer is 0.2 eV or less.

22. A semiconductor device using a thin-film transistor obtained by laminating a gate electrode, a gate insulator, a source electrode, a drain electrode, a semiconductor layer and a protective insulating film in that order on an insulating substrate, wherein the thickness of an organic compound layer present between each of said source and drain electrodes and said semiconductor layer is one-half or less the length of molecules forming said organic compound layer.

23. A semiconductor device according to claim 22, wherein the organic compound present between each of said source and drain electrodes and said semiconductor layer has a thiol group.

24. A semiconductor device according to claim 22, wherein the organic compound present between each of said source and drain electrodes and said semiconductor layer is an alkane thiol.

25. A semiconductor device according to claim 22, wherein said source and drain electrodes are made of gold, silver, copper, platinum, palladium, tin, or an alloy or mixture containing two or more of these metals.

26. A semiconductor device according to claim 22, wherein a decrease of the work function of said source and drain electrodes caused by the influence of the organic compound layer present between each of said source and drain electrodes and said semiconductor layer is 0.2 eV or less.